Claim 1. (Original) A method for immobilizing an anti-thrombogenic material into a coating posited on a surface of an implantable medical device within the mammalian body, comprising:

preparing a base coat mixture for application to the surface of the medical device;

polymerizing the base coat mixture to form a base coat layer on the medical device; and

immobilizing the anti-thrombogenic material directly to chemically functional groups within the base coat layer on the surface of the medical device.

Claim 2. (Original) The method of claim 1, wherein the medical device is a stent.

Claim 3. (Original) The method of claim 1, wherein the base coat mixture is applied to the outside surface of the medical device.

Claim 4. (Original) The method of claim 1, wherein the base coat mixture includes a binding material, a grafting material, a photoinitiator, and a solvent.

Claim 5. (Original) The method of claim 4, wherein the binding material of the base coat is selected from the group consisting of polyaziridine resin compounds, polycarbodiimide resin compounds, aldehyde compounds, oxirane compounds, acetoacetoxy compounds, and isocyanate compounds.

Claim 6. (Original) The method of claim 5, wherein the binding material of the base coat layer is cinnamaldehyde.

Claim 7. (Original) The method of claim 4, wherein the grafting material of the base coat is selected from the group consisting of vinyl, acrylate and allyl compounds.

Claim 8. (Original) The method of claim 7, wherein the grafting material of the base coat layer is polyurethane acrylate.

Claim 9. (Original) The method of claim 7, wherein the grafting material of the base coat layer is polymerized by irradiating the grafting material with ultra-violet (UV) radiation for about eight to ten minutes.

Claim 10. (Original) The method of claim 4, wherein the solvent is selected from the group consisting of ester and ketone compounds.

Claim 11. (Original) The method of claim 1, wherein the anti-thrombogenic agent is heparin.

Claim 12. (Original) The method of claim 1, wherein heparin is immobilized by a reaction between an aqueous heparin solution and chemically functional groups within the base coat layer on the surface of the medical device.

Claim 13. (Original) The method of claim 12, wherein the aqueous heparin solution is selected from the group consisting of unfractionated heparin and N-partially desulfated heparin.

Claim 14. (Original) The method of claim 13, wherein the reaction between the aqueous heparin solution and the chemically functional groups within the base coat layer runs for about eighteen to twenty-four hours at a temperature in the range of 15°C to 80°C and about pH 7.0.

Claim 15. (Original) A method for end-immobilizing an anti-thrombogenic material into a coating posited on a surface of an implantable medical device within the mammalian body, comprising:

preparing a base coat mixture for application to the surface of the medical device;

polymerizing the base coat mixture to form a base coat layer on the medical device; and

end-immobilizing the anti-thrombogenic material directly to chemically functional groups within the base coat layer on the surface of the medical device.

Claim 16. (Original) The method of claim 15, wherein the anti-thrombogenic material is heparin.

Claim 17. (Original) The method of claim 15, wherein heparin is end-immobilized by a reaction between an amine-terminated heparin and chemically functional groups within the base coat layer on the surface of the medical device.

Claim 18. (Original) The method of claim 17, wherein the reaction between amine-terminated heparin and chemically functional groups within the base coat layer runs for about eighteen to twenty-four hours at a temperature in the range of 15°C to 80°C and about pH 7.0.

Claim 19. (Original) A method for immobilizing an anti-thrombogenic material into a coating posited on a surface of an implantable medical device within the mammalian body, comprising:

preparing a base coat mixture for application to the surface of the medical device;

polymerizing the base coat mixture to form a base coat layer on the medical device;

performing a reaction between the base coat layer and excess amine-terminated polyethylene glycol;

rinsing the base coat layer with water; and

performing a reaction between the anti-thrombogenic material and amine-terminated polyethylene glycol on the surface of the medical device.

Claim 20. (Original) The method of claim 18, wherein the reaction between the excess amine-terminated polyethylene glycol and the chemically functional groups within the base coat layer runs for about eighteen to twenty-four hours at a temperature in the range of 15°C to 80°C and about pH 7.0.

Claim 21. (Original) The method of claim 20, wherein the excess amine-terminated polyethylene glycol is PEG(NH2)2.

Claim 22. (Original) The method of claim 21, wherein the concentration of PEG(NH2)2 is about 0.01mg/ml to 20mg/ml.

Claim 23. (Original) The method of claim 19, wherein after completion of the reaction between the excess amine-terminated polyethylene glycol and the chemically functional groups within the base coat layer, the medical device is rinsed with water.

Claim 24. (Original) The method of claim 19, wherein the anti-thrombogenic material is unfractionated heparin.

Claim 25. (Original) The method of claim 24, wherein unfractionated heparin is reacted with amine-terminated polyethylene glycol and a water-soluble carbodiimide on the surface of the medical device for the immobilization of heparin thereon.

Claim 26. (Original) The method of claim 25, wherein the reaction between unfractionated heparin and amine-terminated polyethylene glycol with a water soluble carbodiimide on the surface of the medical device runs for about two to six hours at about room temperature and about pH 4.5 to 7.5.

Claim 27. (Original) The method of claim 19, wherein the anti-thrombogenic material is N-desulfated heparin.

Claim 28. (Original) The method of claim 27, wherein N-desulfated heparin is reacted with amine-terminated polyethylene glycol and a water-soluble carbodiimide on the surface of the medical device for the immobilization of heparin thereon.

Claim 29. (Original) The method of claim 28, wherein the reaction between N-desulfated heparin and amine-terminated polyethylene glycol with a water soluble carbodiimide on the surface of the medical device runs for about two to six hours at about room temperature and about pH 4.5 to 7.5.

Claim 30. (Original) A method for immobilizing an anti-thrombogenic material into a coating posited on a surface of an implantable medical device within the mammalian body, comprising:

preparing a base coat mixture for application to the surface of the medical device;

polymerizing the base coat mixture to form a base coat layer on the medical device; and

performing a reaction between a coupling solution and chemically functional groups within the base coat layer of the device surface.

Claim 31. (Original) The method of claim 30, wherein the coupling solution is heparin and OH-PEG-NH2.

Claim 32. (Original) The method of claim 31, wherein the concentration of the coupling solution is about 0.01mg/ml to 20mg/ml.

Claim 33. (Original) The method of claim 31, wherein the reaction between the coupling solution and chemically functional groups within the base coat layer runs for about eighteen to twenty-four hours at a temperature in the range of 15°C to 80°C and about pH 8.0.

Claim 34. (Original) A method for immobilizing an anti-thrombogenic material into a coating posited on a surface of an implantable medical device within the mammalian body, comprising:

preparing a base coat mixture for application to the surface of the medical device;

polymerizing the base coat mixture to form a base coat layer on the surface of the medical device; and

immobilizing the anti-thrombogenic material directly to chemically functional groups within the base coat layer on the surface of the medical device.

Claim 35. (Original) The method of claim 34, wherein the anti-thrombogenic material is surfactant-bound heparin.

Claim 36. (Original) The method of claim 35, wherein the surfactant-bound heparin includes at least one of benzalkonium heparin and TDMA-heparin.

Claim 37. (Original) The method of claim 35, wherein the surfactant-bound heparin is immobilized by a reaction with cinnamaldehyde on the surface of the medical device.

Claim 38. (Original) The method of claim 37, wherein the reaction between the surfactant-bound heparin and chemically functional groups within the base coat layer on the surface of the medical device runs for about eighteen to twenty-four hours at a temperature in the range of 15°C to 80°C and about pH 7.0.

Claim 39. (Original) A method for immobilizing an anti-thrombogenic material into a coating posited on a surface of an implantable medical device within the mammalian body, comprising:

preparing a base coat mixture for application to the surface of the medical device;

polymerizing the base coat mixture to form a base coat layer on the surface of the medical device;

immobilizing the anti-thrombogenic material directly to chemically functional groups within the base coat layer on the surface of the medical device; and

performing a carbodiimide-mediated reaction to form an amide linkage to a chemical chain of the anti-thrombogenic material attached to the base coat layer.

Claim 40. (Original) The method of claim 39, wherein the anti-thrombogenic material is heparin.

Claim 41. (Original) The method of claim 39, wherein the carbodiimide reaction is between Superoxide dismutase mimetic (SODm) and heparin.

Claim 42. (Original) The method of claim 41, wherein SODm is grafted to the chemical chain of heparin through the carbodiimide reaction.

Claim 43. (Original) The method of claim 41, wherein SODm is reacted with heparin and EDC at about room temperature and about pH 7.0 for about four hours.

Claim 44. (Original) The method of claim 43, wherein heparin includes an aqueous heparin solution.

Claim 45. (Original) The method of claim 39, wherein the carbodiimide-reacted anti-thrombogenic material includes SODm-heparin.

Claim 46. (Original) The method of claim 45, wherein SODm-heparin is end-immobilized in a reaction with chemically functional groups of the base coat layer on the surface of the medical device.

Claims 47-79 (Cancel)